

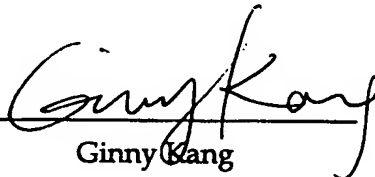


## DECLARATION

I, Ginny Kang, a Korean citizen of #906, Sung-bo Apartment, Yeoksam-dong, Gangnam-gu, Seoul, Korea do hereby solemnly and sincerely declare as follows:

1. That I am well acquainted with the English and Korean languages.
2. That the following is a correct translation into English of Korean Patent Application No. 2003-42054 filed on September 8, 2003, and I make the solemn declaration conscientiously believing the same to be true.

Seoul, January 3, 2007

  
Ginny Kang



## **KOREAN INTELLECTUAL PROPERTY OFFICE**

5           This is to certify that the following application annexed hereto is a true copy  
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Application Number: Patent Application No. 10-2003-0042054

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Applicant(s): Samsung Gwangju Electronics Co., Ltd.

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**COMMISSIONER**

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5 [TITLE OF THE INVENTION-KOREAN] □□□□□□□□ □□□□

[TITLE OF THE INVENTION-ENGLISH] LOCKING UNIT OF CYCLONE  
TYPE DUST COLLECTING APPARATUS

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[EXAMINATION REQUEST] YES

[PURPOSE] I, hereby, submit the present application for the Patent under the Article 42 of the Patent Law

Attorney

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10 [Official Fee]

[Basic fee] 20 pages ☐ 29,000

[Additional fee] 4 pages ☐ 4,000

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[Documents] 1. One copy of Abstract, Specification (& drawings)

## **[ABSTRACT OF THE DISCLOSURE]**

### **[Abstract]**

Disclosed is a locking unit to fix a removable cyclone dust collector in a receiving portion of a main body of a vacuum cleaner. The locking unit comprises a locking recess formed at one side of a contact surface of the cyclone dust collector and the receiving portion, a locker ascending and descending between a locking position and an unlocking position with respect to the locking recess and through a hole which is formed at the other side of the contact surface of the cyclone dust collector and the receiving portion, and an operating member to selectively move the locker to the locking position and the unlocking position. The locking unit having a simple structure enables convenient and easy manufacturing, assembly and operation, and a good appearance.

### **[The main figure]**

Fig. 4

### **[Search term]**

vacuum cleaner, upright type, cyclone, locking unit, operating member, locker

## **[SPECIFICATION]**

### **[The title of the invention]**

LOCKING UNIT OF CYCLONE TYPE DUST COLLECTING APPARATUS

### **[The brief description of the drawings]**

5            Fig. 1 is a sectional view of a conventional locking unit for a cyclone type dust collecting apparatus of an upright type vacuum cleaner;

            Fig. 2 is a perspective view of the conventional cyclone type dust collecting apparatus;

            Fig. 3 is a perspective view of an upright type vacuum cleaner having a  
10    locking unit for a cyclone dust collector according to an embodiment of the present invention;

            Fig. 4 is an exploded view of a main body of the vacuum cleaner of Fig. 3;

            Fig. 5 is an enlarged assembly view of a main portion of Fig. 4, depicting a structure of the locking unit of the cyclone type dust collecting apparatus;

15            Fig. 6 is a rear view of Fig. 5;

            Fig. 7 is a partially enlarged view of a body casing of Fig. 4, depicting a supporting rib supporting an extended bar of an operating member;

            Fig. 8 is a perspective view depicting the operating member in detail; and

            Figs. 9 and 10 are enlarged sectional views of a main portion of Fig. 5,

respectively depicting ascending and descending of a locker in a locking recess by the operating member.

**\*Description of the reference numerals in the drawings\***

	1: vacuum cleaner	5: vacuum generator
5	10: suction brush unit	20: main body
	21: receiving portion	23: body casing
	25: front panel	26: supporting rib
	30: cyclone dust collector	33: dust receptacle
	35: locking recess	41: manipulating unit
10	43: front plate	44: locker hole
	45: bottom plate	50: locking unit
	71: locker	73, 75: extended portions
	81: operating member	82: grip
	84: movable threshold	85: extended bar
15	86: operating cam	89: movable projection
	91: indicator	94, 94': fixed limiting projections
	99, 99': fixed protuberances	

**[Detailed description of the invention]**

**[Object of the invention]**

**[The field of the invention and the prior art]**

The present invention relates to a vacuum cleaner having a cyclone type dust collecting apparatus, and more specifically to a locking unit to removably fix a cyclone  
5 type dust collecting apparatus to an upright type vacuum cleaner.

Referring to Fig. 3, an upright type vacuum cleaner comprises a main body 20 having a suction brush unit 10 mounted therein, and a cyclone type dust collecting apparatus 30 received in a receiving portion 21 of the main body 20 of the vacuum cleaner. The cyclone type dust collecting apparatus 30 centrifugally separates dust and  
10 dirt from an air, which is a technology widely known in the related art. The cyclone type dust collecting apparatus 30 is fixed in the receiving portion 21 using a locking unit.

Fig. 1 is a cross sectional view of the cyclone type dust collecting apparatus 30 being fixed in the receiving portion 21 by a conventional locking unit. Fig. 2 is an  
15 exploded perspective view of a main portion of the conventional locking unit of Fig. 1.

Referring Figs 1 and 2, the conventional locking unit 100 comprises a supporting bracket 101 disposed on a bottom plate 45 of the receiving portion 21 (see Fig. 3), a movable disk 111 rotatably disposed in the supporting bracket 101, and a locking disk 121 disposed at an upper portion of the movable disk 111 to move upward and



downward.

At a center portion of the movable disk 111 is formed a hinge axis 112, and at a center of the hinge axis 112 is formed an axis hole 113. The axis hole 113 of the movable disk 111 is rotatably connected with an axis 102 which is protruding at a center of the region surrounded by the supporting bracket 101. The hinge axis 112 of the movable disk 111 is rotatably connected with a hinge hole 123 at a center of the locking disk 121. On a top side of the movable disk 111, a cam 115 is formed along a circumference of the movable disk 111 at a predetermined inclination.

Also, on a bottom side of the locking disk 121 is formed a cam 125 along a circumference of the locking disk 121 at a predetermined inclination. Accordingly, upon rotating the movable disk 111 in a clockwise or counter clockwise direction, the locking disk 121 is moved upward and downward by the cooperation of the cam 115 of the movable disk 111 and the cam 125 of the locking disk 121. At an outer surface of the movable disk 111 is formed an operating lever 118 being extended in a radial direction of the movable disk 111 for the grab of a user to rotate the movable disk 111 in the clockwise or counter clockwise direction.

At a bottom side of the cyclone type dust collecting apparatus 131, a receiving recess 133 is depressed in for receiving the locking unit 100. At an inner wall of the receiving recess 133 is formed a fixing recess 135 to be engaged with the locking disk

121. For instance, upon rotating the movable disk 111 in the clockwise direction by moving the operating lever 118, the locking disk 121 is ascended. The locking disk 121 ascends into the fixing recess 135 of the cyclone type dust collecting apparatus 131, and by the engagement of the fixing recess 135 and the movable disk 111, the cyclone  
5 type dust collecting apparatus 131 is fixed.

However, the locking unit 100 of the conventional cyclone type dust collecting apparatus 30 described above has a complicated structure and a bulky size. Also, it is difficult to manufacture and assemble the locking unit 100, since the receiving recess 133 and the fixing recess 135 are respectively formed at the bottom side of the cyclone  
10 type dust collecting apparatus 30, to thereby increase the manufacturing cost. In addition, separating the cyclone type dust collecting apparatus 30 from the receiving portion 21 is complicated. Especially, the bulky locking unit 100 is exposed outside to thereby depreciate an appearance of the vacuum cleaner.

For the user's side, it is hard to manipulate the locking unit 100 with one hand  
15 by moving the operating lever 118 in the horizontal direction with respect to the vacuum cleaner.

#### **[Technical object of the invention]**

In view of the above shortcomings, an aspect of the present invention is to

provide a locking unit of a cyclone dust collector having a simple structure, which enables easy and convenient manufacturing and assembling to thereby reduce the manufacturing cost.

Another aspect of the present invention is to provide a locking unit of a cyclone  
5 dust collector which enhances an appearance of a vacuum cleaner.

Yet another aspect of the present invention is to provide a locking unit by which a cyclone dust collector is fixed with a simple operation.

#### **[Construction and operation of the invention]**

10 To accomplish the above aspects and features of the present invention, a locking unit of a cyclone dust collector of a vacuum cleaner, which is removably received in a receiving portion of a main body of the vacuum cleaner, comprises a locking recess formed at one side of a contact surface of the cyclone dust collector and the receiving  
portion, a locker ascending and descending between a locking position and an unlocking  
15 position with respect to the locking recess and through a hole which is formed at the other side of the contact surface of the cyclone dust collector and the receiving portion, and an operating member to selectively move the locker to the locking position and the unlocking position.

The locking recess is formed by depressing upwardly at a bottom side of the

cyclone dust collector, and the locker is received in a manipulating unit disposed at a lower portion of the receiving portion to move upward and downward through the hole at a bottom side of the receiving portion.

The operating member comprises a grip rotatably exposed toward a front side of the manipulating unit, an extended bar extended from the grip toward the locker passing  
5 through the front side of the manipulating unit, and an operating cam formed on a free end of the extended bar eccentrically. The operating cam rotates together with the grip and moves the locker upward and downward.

At the front side of the manipulating unit is disposed an indicator to indicate  
10 locking and unlocking of the locker with respect to the locking recess. The indicator includes means to securely fix the grip of the operating member in the locking position or the unlocking position. The indicator includes a pair of limiting projections disposed at regular intervals within a rotating range of the grip to prevent an excessive rotation of the grip.

15 The main body of the vacuum cleaner comprises a body casing; and a front panel coupled to a front side of the body casing to form a receiving portion, which has the manipulating unit at a lower portion thereof.

Hereinafter, an embodiment of the present invention will be described in greater detail, with reference to the accompanying drawings.

Fig. 3 is a perspective view of an upright type vacuum cleaner having a locking unit of a cyclone dust collector according to the present invention, and Fig. 4 is an exploded view of the upright type vacuum cleaner of Fig. 3. As shown in Figs. 3 and 4, the upright type vacuum cleaner 1 comprises a main body 20 having an receiving portion 21 formed therein, a cyclone dust collector 30 removably mounted in the receiving portion 21, and a suction brush unit 10. The main body 20 has a handle 3 at an upper portion thereof.

The main body 20 comprises a body casing 23 and a front panel 25 coupled to a front side of the body casing 23. At a lower portion of the front panel 25 is mounted a vacuum generator 5, which is shielded by a cover 7. The front panel 21 has an opening at a center thereof to form the receiving portion 21. The front panel 21 has a manipulating unit 41 at a lower portion of the receiving portion 21, in which the locking unit 50 is disposed. The manipulating unit 41 is partitioned by a bottom plate 45 and a front plate 43 of the receiving portion 21.

The main body 20, which has the body casing 23 and the front panel 25, is usually provided with an inlet pipe 23a and an outlet duct 23b. The inlet pipe 23a interconnects a suction port of the cyclone dust collector 30 with the suction brush unit 10. The outlet duct 23b interconnects a discharge port of the cyclone dust collector 30 with the vacuum generator 5. When the vacuum generator 5 is driven, a suction force

is applied to the suction brush unit 10, drawing in an air containing dust and dirt into the inlet pipe. The drawn air is flown into the cyclone dust collector 30 via the suction port, and the dust and dirt is centrifugally separated from the air and collected in the cyclone dust collector 30. As a result, the clean air is discharged to the discharge port and outside through the outlet duct.

To centrifugally separate the dust and dirt from the air, the cyclone dust collector 30 comprises a cyclone body 31 and a dust receptacle 33 removably disposed at a lower portion of the cyclone body 31. The cyclone dust collector 30 is a well-known technology and has been disclosed in many patent applications by various applicants including the present applicant. Accordingly, a detailed description on the cyclone dust collector 30 is omitted. However, according to the present invention, at a lower portion of the cyclone dust collector 30, i.e., at a bottom side of the dust receptacle 33, a locking recess 35 (see Figs. 9 and 10) is formed. The locking recess 35 will be described in detail later on together with a locker 71.

Fig. 5 is an enlarged assembly view of a main portion of Fig. 4 being assembled, depicting the structure of a locking unit of the cyclone dust collector 30. Fig. 6 is a rear view of Fig. 5. As shown in Figs. 5 and 6, the locking unit 50 comprises the locker 71 disposed in the manipulating unit 41 to be ascending and descending through the bottom plate 45 of the receiving portion 21, the locking recess 35 (Fig. 9) formed at a bottom 34

of the cyclone dust collector 30, and an operating member 81 to ascend the locker 71 through the front side of the manipulating unit 41.

In the bottom plate 45 of the receiving portion 21, a locker hole 44 (see Fig. 4) is formed for the ascent/descent of the locker 71. The locker 71 received in the locker hole 44 is ascended to a locking position (see Fig. 10) and descended to an unlocking position (see Fig.9). The locker 71 is locked to and unlocked from the locking recess 35 of the bottom 34 of the cyclone dust collector 30. Extended portions 73, 75 are protruded outside the locker 71 for limiting a range of ascending and descending movement of the locker 71. The upper extended portion 75 is extended outward from an upper portion of the locker 71, and the lower extended portion 73 is extended outward from both sides of the locker 71. The extended portions 73, 75 are positioned at a regular distance from each other, and the bottom plate 45 of the receiving portion 21 is disposed between the extended portions 73 and 75. At the locker hole 44 of the bottom plate 45, a rib 46 is projected upwardly to support the ascending and descending of the locker 71.

The operating member 81, as shown in Fig. 7 in detail, comprises an extended bar 85 having a regular sectional radius, a grip 83 at one end of the extended bar 85 extending in a radial direction thereof, and a operating cam 86 formed at a center portion of the extended bar 85. The extended bar 85 passes through the front plate 43

of the manipulating unit 41 and is received therein. The front plate 43 has a through hole 48 to allow the passing of the extended bar 85. The through hole 48 is formed opposed to the extended bar 85 so as to allow the passing of the operating cam 86 which is integrally formed with the extended bar 85.

5           The grip 82 is rotatable and exposed on the front plate 43 of the manipulating unit 41. At both sides of the grip 82, knurls 83 are formed for an easy grip of a user. At an inner side of the grip 82, i.e., at a side opposing to the front plate 43 of the manipulating unit 41, a movable threshold 84 is projected. At a center portion of the movable threshold 84 is projected a movable projection 89. The movable threshold 84  
10 and the movable projection 89 are connected with fixed limiting projections 94, 94' and fixed protuberances 99, 99' formed at the front plate 41 of the manipulating unit 41, which will be described later on.

          The operating cam 86 is extended from the extended bar 85 in an opposite direction to the extension direction of the grip 85 with respect to the extended bar 85.  
15 On turning the grip 83 to a horizontal plane, the operating cam 86 is subsequently disposed in a horizontal plane. The operating cam 83 in the horizontal plane, as shown in Fig. 9, allows the locker 71 to be descended, i.e., to the unlocking position. On turning the grip 83 to a vertical plane, the operating cam 86 is subsequently rotated to a vertical direction. The operating cam 86 in the vertical plane, as shown in Fig. 10,



causes the locker 71 to be ascended, i.e., to the locking position.

An indicator 91 is disposed at the front plate 43 of the manipulating unit 41 to indicate the position of the locker 71. With respect to the indicator 91 includes a “LOCK” mark formed at the vertical position and an “UNLOCK” mark formed at the horizontal position (see Fig. 5). When the grip 83 is positioned at the “LOCK” mark, this means that the locker 71 is at the locking position with respect to the locking recess 35 of the cyclone dust collector 30. When the grip 83 is positioned at the “UNLOCK” mark, this means that the locker 71 is descended to the unlocking position.

The indicator 91 includes the fixed limiting projections 94, 94' respectively protruded at the “LOCK” mark and the “UNLOCK” mark. The fixed limiting projections 94 and 94' in cooperation with the movable threshold 84 of the grip 83 prevent an excessive rotation of the grip 83. At an inner side of each fixed limiting projection 94, 94', the fixed protuberances 99, 99' are projected respectively. Each of the fixed protuberances 99, 99' is engaged with the movable projection 89 of the grip 82. Accordingly, the grip 82 of the manipulating member 81 is securely positioned at the “LOCK” mark or the “UNLOCK” mark on the indicator 91.

A terminal end 88 of the operating member 81, which is passed through the front plate 43 of the manipulating unit 41 and received therein, is rotatably supported by a supporting rib 26. As shown in Fig. 8, the supporting rib 26 may preferably be

disposed in the body casing 23.

The locking unit 50 having the above structure enables the user to manipulate the grip 82 of the operating member 81 with convenience, with the grip 82 exposed toward a front of the manipulating unit 41. In order to separate the cyclone dust collector 30 from the receiving portion 21, the user rotates the grip 82 to the “UNLOCK” mark. The grip 82 is secured at the “UNLOCK” mark by the engagement of the movable projection 89 with the fixed protuberance 99' of the indicator 91. The user separates the cyclone dust collector 30, removes the dust and dirt in the dust receptacle 33, and re-mounts the cyclone dust collector 30 in the receiving portion 21.

In order to fix the cyclone dust collector 30 in the receiving portion 21, the user rotates the grip 82 to the lock mark. With the grip 82 at the lock mark, the operating cam 86 eccentric to the extended bar 85 raises the locker 71. At the locking position, the locker 71 and the locking recess 35 of the dust receptacle 33 are engaged with each other to thereby securely fix the cyclone dust collector 30 in the receiving portion 21.

In the main body 20 of the vacuum cleaner 1 according to the above embodiment, the manipulating unit 41 at the lower portion of the front panel 25 includes the operating member 81 and the locker 71, while the dust receptacle 33 of the cyclone dust collector 30 includes the locking recess 35. However, the aspects, features and advantages of the present invention will be also accomplished by variations such as the

dust receptacle 35 having the operating member 81 and the locker 71, and the manipulating unit 41 having the locking recess 35.

**[Effect of the invention]**

5           According to an embodiment of the present invention, the locking unit having a simple structure enables convenient and easy manufacturing, assembly and operation.

          The locking unit of the cyclone dust collecting apparatus according to an embodiment of the present invention can fix the cyclone dust collecting apparatus with  
10   the simple structure. In addition, even when the cyclone dust collecting apparatus is withdrawn, exposed inner view does not depreciate an appearance of the vacuum cleaner.

          While the preferred embodiment of the present invention has been described, additional variations and modifications in that embodiment may occur to those skilled  
15   in the art once they learn of the basic inventive concepts. Therefore, it is intended that the appended claims shall be construed to include both the preferred embodiment and all such variations and modifications as fall within the spirit and scope of the invention.

**[What is claimed is]**

**[Claim 1]**

A locking unit of a cyclone dust collector of a vacuum cleaner, which is  
removably received in a receiving portion of a main body of the vacuum cleaner,  
5 comprising:

a locking recess formed at one side of a contact surface of the cyclone dust  
collector and the receiving portion;

a locker ascending and descending between a locking position and an unlocking  
position with respect to the locking recess and through a hole which is formed at the  
10 other side of the contact surface of the cyclone dust collector and the receiving portion;  
and

an operating member to selectively move the locker to the locking position and  
the unlocking position.

**[Claim 2]**

15 The locking unit of claim 1, wherein the locking recess is formed by depressing  
upwardly at a bottom side of the cyclone dust collector, and the locker is received in a  
manipulating unit disposed at a lower portion of the receiving portion to move upward  
and downward through the hole at a bottom side of the receiving portion.

**[Claim 3]**

The locking unit of claim 2, wherein the operating member comprises:

a grip rotatably exposed toward a front side of the manipulating unit;

an extended bar extended from the grip toward the locker passing through the front side of the manipulating unit; and

5 an operating cam formed on a free end of the extended bar eccentrically, the operating cam to rotate together with the grip and move the locker upward and downward.

**[Claim 4]**

The locking unit of claim 3, wherein, in the main body of the vacuum cleaner is

10 formed a supporting rib to rotatably support a terminal end of the extended bar.

**[Claim 5]**

The locking unit of claim 3, wherein, at the front side of the manipulating unit is disposed an indicator to indicate locking and unlocking of the locker with respect to the locking recess.

15 **[Claim 6]**

The locking unit of claim 5, wherein the indicator includes means to securely fix the grip of the operating member in the locking position or the unlocking position.

**[Claim 7]**

The locking unit of any of claim 5 or 6, wherein the indicator includes a pair of

limiting projections disposed at regular intervals within a rotating range of the grip to prevent an excessive rotation of the grip.

**[Claim 8]**

The locking unit of claim 3, wherein the main body of the vacuum cleaner  
5 comprises:

a body casing; and

a front panel coupled to a front side of the body casing to form a receiving portion, which has the manipulating unit at a lower portion thereof.